Amendments to the Drawings

Applicants submit herewith a Replacement Drawing Sheet for Fig. 1 to correct a minor informality. More specifically, the label of picture-taking apparatus 131 is being corrected from "Picture-talking apparatus" to "Picture-taking apparatus". An annotated marked-up drawing sheet with the correction indicated in red ink is also attached.

Attachments: One Annotated Marked-Up Drawing Sheet
One Replacement Drawing Sheet

REMARKS

The present Amendment amends claims 1-18, and leaves claims 19-21 unchanged. Therefore, the present application has pending claims 1-21.

Claims 1-18 were amended to more clearly describe features of the present invention. These amendments do not change the scope of the claims.

Allowable Subject Matter

The Examiner allowed claims 7-9, 14, 15, 17, 18, 20, and 21, and objected to claims 4-6 as being dependent upon a rejected base claim. Applicants made minor editorial amendments to claims 7-9, 14, 15, 17, and 18. These amendments to claims 7-9, 14, 15, 17, and 18 do not change the scope of the claims.

The Examiner did not provide any prior art rejections regarding claims 11 and 12. Therefore, it is presumed that claims 11 and 12 are allowable over the prior art.

Drawings

Fig. 1 was amended to correct minor informalities. These changes are supported by the disclosure.

35 U.S.C. §101 Rejections

Claims 10-12 stand rejected under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter. This rejection is traversed for the following reasons. Applicants submit that claims 10-12, as now more clearly recited, are directed to statutory subject matter. Specifically, Applicants amended claims 10-12, to recite where the program is embodied by a computer-readable storage medium, in accordance with the Examiner's recommendation. Therefore, this rejection is overcome, and should be withdrawn.

35 U.S.C. §103 Rejections

Claims 1-3, 10, 13, 16, and 19 are rejected under 35 U.S.C. §103(a) as being unpatentable over Japanese Patent No. 2000-175019 to Yoshiura et al. ("Yoshiura") in view of U.S. Patent No. 7,020,304 to Alattar et al. ("Alattar"), and in further view of U.S. Patent No. 6,687,412 to Rao et al. ("Rao"). This rejection is traversed for the following reasons. Applicants submit that the features of the present invention, as now more clearly recited in claims 1-3, 10, 13, 16, and 19, are not taught or suggested by Yoshiura, Alattar or Rao, whether taken individually or in combination with each other in the manner suggested by the Examiner. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Amendments were made to the claims to more clearly describe features of the present invention. Specifically, amendments were made to the claims to more clearly recite that the present invention is directed to a digital-watermark-embedding apparatus, a program executed by a computer, an information-processing system, an integrated circuit, and a digital-watermark embedding method as recited, for example, in independent claims 1, 10, 13, 16, and 19.

The present invention, as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19, provides a digital-watermark-embedding apparatus for embedding a digital watermark into content. The apparatus includes a picture input unit for inputting the content, a vision-sensitivity computation unit and a digital-watermark embedment unit, which are connected to the picture input unit, and a picture compression unit connected to the vision-sensitivity computation unit and the digital-watermark embedment unit. According to the present invention, the vision-sensitivity computation unit creates a noise-vision-sensitivity index from a variance of luminance values of a block included in a picture frame received from the picture

input unit and outputs the noise-vision-sensitivity index to the digital-watermark embedment unit and the picture compression unit. Also according to the present invention, the digital-watermark embedment unit embeds the digital watermark into the picture frame by changing luminance values of each block included in the picture frame on the basis of the noise-vision-sensitivity index received from the vision-sensitivity computation unit, and outputs the picture frame including the embedded digital watermark to the picture compression unit. Furthermore, according to the present invention, the picture compression unit creates a quantization parameter on the basis of the noise-vision-sensitivity index received from the vision-sensitivity computation unit, and compresses the picture frame including the embedded digital watermark on the basis of the quantization parameter. The prior art does not teach or suggest all of these features.

To further illustrate features of the present invention, the Examiner's attention is directed to Fig. 1, and the accompanying text. As shown, the picture to be used as a content is taken by using a picture-taking apparatus 131 or a picture already stored in a picture storage apparatus 152. A taken picture 1310 or a stored picture 1520 is supplied to a raw-picture input unit 130 as raw-picture input data 1301. The raw-picture input unit 130 splits the raw-picture input data 1301 into individual static-picture frames and outputs each of the static-picture frames as a static-picture frame 1300. The static-picture frame 1300 is supplied to a motion-searching unit 21, a noise-vision-sensitivity computation unit 22 and a digital-watermark embedment unit 23.

The motion-searching unit 21 searches the static-picture frames for a motion vector representing a motion of the moving picture and outputs a result of the search process to the digital-watermark embedment unit 23 and a picture compression unit

24 as a motion-searching vector 210. On the other hand, the noise-vision-sensitivity computation unit 22 computes a noise-vision-sensitivity index representing a human being's sensitivity to a noise contained in the picture, outputting a result of the computation to the digital-watermark embedment unit 23 and the picture compression unit 24 as a noise-vision-sensitivity index 220.

The digital-watermark embedment unit 23 embeds a digital watermark into the static-picture frame 1300 by using the motion-searching vector 210 and the noise-vision-sensitivity index 220, outputting a result of the embedment to the picture compression unit 24 as an embedded-digital-watermark-containing picture frame 230. The picture compression unit 24 compresses the embedded-digital-watermark-containing picture frame 230 by using the motion-searching vector 210 and the noise-vision-sensitivity index 220, supplying output picture compressed data 240 to a compressed-data output unit 150.

The compressed-data output unit 150 converts the output picture compressed data 240 into a continuous data sequence by properly buffering the output picture compressed data 240, supplying the data sequence to a compressed-data storage apparatus 153 and/or a network connection apparatus 16 as output compressed data 1500. The compressed-data storage apparatus 153 stores the output compressed data 1500 in a storage medium. On the other hand, the network connection apparatus 16 transmits the output compressed data 1500 to an apparatus connected to the network connection apparatus 16 by a network.

In the exemplary configuration described above, a static-picture property to be used in a compression process is computed from a picture before a digital watermark is embedded into the picture. As a result, it is possible to avoid a compression process by incorrectly recognizing a picture including an embedded

digital watermark as a disorderly picture. The prior art does not teach all of these features.

The above described features of the present invention, as now more clearly recited in the claims, are not taught or suggested by any of the references of record. Specifically, the features are not taught or suggested by either of Yoshiura, Alattar or Rao, whether taken individually or in combination with each other.

Yoshiura teaches an information embedding method and apparatus. However, there is no teaching or suggestion in Yoshiura of the digital-watermark-embedding apparatus, the program executed by a computer, the information-processing system, the integrated circuit, or the digital-watermark embedding method as recited in claims 1, 10, 13, 16, and 19 of the present invention.

Yoshiura discloses a method for embedding watermark information with suppressed deterioration of contents quality and increased robustness of embedded information. When watermark information is embedded in a moving image data consisting of plural static image frames arranged in time series, motion vectors (moving image properties) are detected for each image block in a noticed frame. In addition, a specification rule of an image change rate of each block is selected according to a motion amount. As many pixels as specified in the rule are selected from brightness changeable pixels depending on image state (static image properties) within each block, and brightness changes as watermark information is made.

One feature of the present invention, as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19, includes where the vision-sensitivity computation unit creates a noise-vision-sensitivity index from a variance of luminance values of a block included in a picture frame received from the picture

input unit and outputs the noise-vision-sensitivity index to the digital-watermark embedment unit and the picture compression unit. Yoshiura does not disclose this feature. To support the assertion that Yoshiura teaches this feature, the Examiner cites paragraphs 24-28. However, neither the cited text nor any other portions of Yoshiura teach the claimed features.

For example, the cited text does not teach where the vision-sensitivity computation unit creates a noise-vision-sensitivity index from a variance of luminance values of a block included in a picture frame received from the picture input unit. As described on page 5 of the Office Action, "the Examiner takes **official notice** that it would have been exceedingly obvious at the time of the invention to one of ordinary skill in the art to create an index number from the noise vision sensitivity. The reason is because creating index numbers to represent values is a common technique used to send data between different parts of a system as it allows for efficient information exchange" (emphasis added). The Examiner is reminded that if **official notice** is taken of a fact, and is unsupported by documentary evidence, the technical line of reasoning underlying the Examiner's decision to take such notice must be clear and unmistakable. Applicants submit that it is not clear and unmistakable that one would be motivated to modify Yoshiura in view of Alattar, further in view of Rao for the reasons asserted by the Examiner. (See *In re Zurko*, 258 F.3d 1379, 59 USPQ2d 1693 (Fed. Cir. 2001) (holding that general conclusions concerning what is "basic knowledge" or "common sense" to one of ordinary skill in the art without specific factual findings and some concrete evidence in the record to support these findings will not support an obviousness rejection)). Accordingly, Yoshiura does not teach or suggest the claimed feature.

By way of further example, the cited text does not teach where the vision-sensitivity computation unit outputs the noise-vision-sensitivity index to the digital-watermark embedment unit and to the picture compression unit, in the manner claimed. As shown in Fig. 1 of the present application, the present invention includes where the outputs of the vision-sensitivity unit 22 are provided to both the digital-watermark embedment unit 23 and the picture compression unit 24. Yoshiura does not teach or suggest these features.

Another feature of the present invention, as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19, includes where the digital-watermark embedment unit embeds the digital watermark into the picture frame by changing luminance values of each block included in the picture frame on the basis of the noise-vision-sensitivity index received from the vision-sensitivity computation unit, and outputs the picture frame including the embedded digital watermark to the picture compression unit. Yoshiura does not disclose this feature. Although the Examiner concedes that "Yoshiura does not explicitly disclose changing the variance of the luminance value," the Examiner asserts that Yoshiura teaches the remaining features of the claimed digital-watermark embedment unit, citing paragraphs 22-28. However, contrary to the Examiner's assertions, neither the cited text nor any other portions of Yoshiura teach or suggest all of the remaining claimed features.

For example, as previously discussed, Yoshiura fails to teach or suggest creating a noise-vision-sensitivity index, as claimed. It follows, therefore, that Yoshiura fails to teach or suggest embedding the digital watermark based on the noise-vision-sensitivity index received from the vision-sensitivity computation unit.

By way of further example, Yoshiura fails to teach or suggest where the digital-watermark embedment unit outputs the picture frame including the embedded

digital watermark to the picture compression unit, in the manner claimed. As shown in Fig. 1 of the present application, the present invention includes where the outputs of the vision-sensitivity unit 22 are provided to both the digital-watermark embedment unit 23 and the picture compression unit 24, and further includes where the output of the digital-watermark embedment unit 23 is provided to the picture compression unit 24. Yoshiura does not teach or suggest these features.

Yet another feature of the present invention, as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19, includes where the picture compression unit creates a quantization parameter on the basis of the noise-vision-sensitivity index received from the vision-sensitivity computation unit, and compresses the picture frame including the embedded digital watermark on the basis of the quantization parameter. Yoshiura does not disclose this feature. Although the Examiner concedes that Yoshiura does not "explicity disclose compressing the image," the Examiner asserts that Yoshiura teaches the remaining features of the claimed picture compression unit, citing paragraphs 22-28. However, neither the cited text nor any other portions of Yoshiura teach or suggest the claimed features.

For example, as previously discussed, Yoshiura fails to teach or suggest creating a noise-vision-sensitivity index, as claimed. It follows, therefore, that Yoshiura fails to teach or suggest creating a quantization parameter based on the noise-vision-sensitivity index received from the vision-sensitivity computation unit.

By way of further example, Yoshiura fails to teach or suggest where the picture compression unit receives an input from the vision-sensitivity unit, in the manner claimed. As shown in Fig. 1 of the present application, the present invention includes where the outputs of the vision-sensitivity unit 22 are provided to both the

digital-watermark embedment unit 23 and the picture compression unit 24, and further includes where the output of the digital-watermark embedment unit 23 is provided to the picture compression unit 24. Yoshiura does not teach or suggest these features.

Therefore, Yoshiura fails to teach or suggest "wherein said vision-sensitivity computation unit creates a noise-vision-sensitivity index from a variance of luminance values of a block included in a picture frame received from said picture input unit and outputs said noise-vision-sensitivity index to said digital-watermark embedment unit and said picture compression unit" as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19.

Furthermore, Yoshiura fails to teach or suggest "wherein said digital-watermark embedment unit embeds said digital watermark into said picture frame by changing luminance values of each block included in said picture frame on the basis of said noise-vision-sensitivity index received from said vision-sensitivity computation unit, and outputs said picture frame including said embedded digital watermark to said picture compression unit" as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19.

Even further, Yoshiura fails to teach or suggest "wherein said picture compression unit creates a quantization parameter on the basis of said noise-vision-sensitivity index received from said vision-sensitivity computation unit, and compresses said picture frame including said embedded digital watermark on the basis of said quantization parameter" as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19.

The above noted deficiencies of Yoshiura are not supplied by any of the other references of record, namely Alattar, whether taken individually or in combination

with each other. Therefore, combining the teachings of Yoshiura and Alattar in the manner suggested by the Examiner still fails to teach or suggest the features of the present invention as now more clearly recited in the claims.

Alattar teaches a method of digital watermarking and fingerprinting, including synchronization, layering, version control, and compressed embedding. However, there is no teaching or suggestion in Alattar of the digital-watermark-embedding apparatus, the program executed by a computer, the information-processing system, the integrated circuit, or the digital-watermark embedding method as recited in claims 1, 10, 13, 16, and 19 of the present invention.

Alattar discloses several video watermarking and fingerprinting enhancements. The enhancements include synchronizing watermark detectors with one-dimensional calibration signals, layering digital watermarks, watermarks for version control, compressed domain watermarking, watermarking of video object layers, key channel watermark embedding for video, robust fingerprinting of video and watermarking of scalable video.

One feature of the present invention, as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19, includes where the vision-sensitivity computation unit creates a noise-vision-sensitivity index from a variance of luminance values of a block included in a picture frame received from the picture input unit and outputs the noise-vision-sensitivity index to the digital-watermark embedment unit and the picture compression unit. Alattar does not disclose this feature, and the Examiner does not rely upon Alattar for teaching this feature.

Another feature of the present invention, as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19, includes where the digital-watermark embedment unit embeds the digital watermark into the picture frame by changing

luminance values of each block included in the picture frame on the basis of the noise-vision-sensitivity index received from the vision-sensitivity computation unit, and outputs the picture frame including the embedded digital watermark to the picture compression unit. Alattar does not disclose this feature. The Examiner relies upon Alattar for teaching changing luminance values of each block, citing column 20, lines 9-19. However, the features of Alattar are quite different from the present invention. For example, as described in column 20, lines 9-19, Alattar teaches where examples of statistics that can be used for a fingerprint include the frame average for luminance and the variance. This is not the same as changing luminance values of each block included in the picture frame based on a noise-vision-sensitivity index, as claimed. In addition to failing to teach changing luminance values, as claimed, Applicants submit that neither the cited text nor any other portions of Alattar teach or suggest the deficient features previously discussed with regard to Yoshiura.

Yet another feature of the present invention, as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19, includes where the picture compression unit creates a quantization parameter on the basis of the noise-vision-sensitivity index received from the vision-sensitivity computation unit, and compresses the picture frame including the embedded digital watermark on the basis of the quantization parameter. Alatarr does not disclose this feature, and the Examiner does not rely upon Alattar for teaching this feature.

Therefore, Alattar fails to teach or suggest "wherein said vision-sensitivity computation unit creates a noise-vision-sensitivity index from a variance of luminance values of a block included in a picture frame received from said picture input unit and outputs said noise-vision-sensitivity index to said digital-watermark

embedment unit and said picture compression unit" as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19.

Furthermore, Alattar fails to teach or suggest "wherein said digital-watermark embedment unit embeds said digital watermark into said picture frame by changing luminance values of each block included in said picture frame on the basis of said noise-vision-sensitivity index received from said vision-sensitivity computation unit, and outputs said picture frame including said embedded digital watermark to said picture compression unit" as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19.

Even further, Alattar fails to teach or suggest "wherein said picture compression unit creates a quantization parameter on the basis of said noise-vision-sensitivity index received from said vision-sensitivity computation unit, and compresses said picture frame including said embedded digital watermark on the basis of said quantization parameter" as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19.

The above noted deficiencies of Yoshiura and Alattar are not supplied by any of the other references of record, namely Rao, whether taken individually or in combination with each other. Therefore, combining the teachings of Yoshiura and Rao in the manner suggested by the Examiner still fails to teach or suggest the features of the present invention as now more clearly recited in the claims.

Rao teaches a method and system for generating image compression quantization matrices. However, there is no teaching or suggestion in Rao of the digital-watermark-embedding apparatus, the program executed by a computer, the information-processing system, the integrated circuit, or the digital-watermark

embedding method as recited in claims 1, 10, 13, 16, and 19 of the present invention.

Rao discloses a system for generating image compression matrices. The system includes an image having pixel block arrays (104), and a transformer that performs discrete cosine transforms on the pixel block arrays (104) to generate a discrete cosine transform array (107). The system also includes a quantizer that receives the discrete cosine transform array and retrieves a quantization coefficient matrix and a model metric. Quantizer partitions the quantization coefficient matrix with the model metric to generate a quantization matrix. Quantizer also quantizes discrete cosine transform array with the quantization matrix to create a quantized array. The Rao system also includes an encoder that compresses the quantized array.

One feature of the present invention, as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19, includes where the vision-sensitivity computation unit creates a noise-vision-sensitivity index from a variance of luminance values of a block included in a picture frame received from the picture input unit and outputs the noise-vision-sensitivity index to the digital-watermark embedment unit and the picture compression unit. Rao does not disclose this feature, and the Examiner does not rely upon Rao for teaching this feature.

Another feature of the present invention, as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19, includes where the digital-watermark embedment unit embeds the digital watermark into the picture frame by changing luminance values of each block included in the picture frame on the basis of the noise-vision-sensitivity index received from the vision-sensitivity computation unit, and outputs the picture frame including the embedded digital watermark to the

picture compression unit. Rao does not disclose this feature, and the Examiner does not rely upon Rao for teaching this feature.

Yet another feature of the present invention, as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19, includes where the picture compression unit creates a quantization parameter on the basis of the noise-vision-sensitivity index received from the vision-sensitivity computation unit, and compresses the picture frame including the embedded digital watermark on the basis of the quantization parameter. Rao does not disclose this feature. The Examiner relies upon Rao for teaching where the picture compression unit compresses the picture frame including the embedded digital watermark, citing column 4, line 63 to column 5, line 37. Applicants submit that the combination of Yoshiura, Alattar and Rao does not teach or suggest the picture compression unit, as claimed.

For example, as described on page 10, lines 3-7, the present invention includes where a static-picture property to be used in a compression process is computed from a picture before a digital watermark is embedded into the picture. As a result, it is possible to avoid a compression process by incorrectly recognizing a picture including an embedded digital watermark as a disorderly picture. As also described on page 4, lines 7-19, in the conventional digital-watermark embedment unit and the conventional compression apparatus, computation of a static-picture property used in a compression process is carried out on a picture already including an embedded digital watermark (i.e., on a picture with changes made to values of pixels). Therefore, a result of the computation of a static-picture property on a picture already including an embedded digital watermark is different from a result of the computation of a static-picture property of the original picture, as in the present

invention. The combination of Rao with Yoshiura in view of Alattar results in a compression of a computation of a static-picture property on a picture already including an embedded digital watermark, and compression of the same, which is quite different from the present invention.

Therefore, Rao fails to teach or suggest "wherein said vision-sensitivity computation unit creates a noise-vision-sensitivity index from a variance of luminance values of a block included in a picture frame received from said picture input unit and outputs said noise-vision-sensitivity index to said digital-watermark embedment unit and said picture compression unit" as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19.

Furthermore, Rao fails to teach or suggest "wherein said digital-watermark embedment unit embeds said digital watermark into said picture frame by changing luminance values of each block included in said picture frame on the basis of said noise-vision-sensitivity index received from said vision-sensitivity computation unit, and outputs said picture frame including said embedded digital watermark to said picture compression unit" as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19.

Even further, Rao fails to teach or suggest "wherein said picture compression unit creates a quantization parameter on the basis of said noise-vision-sensitivity index received from said vision-sensitivity computation unit, and compresses said picture frame including said embedded digital watermark on the basis of said quantization parameter" as recited in claim 1, and as similarly recited in claims 10, 13, 16, and 19.

Each of Yoshiura, Alattar and Rao suffer from the same deficiencies, relative to the features of the present invention, as recited in the claims. Therefore,

combining the teachings of Yoshiura, Alattar and Rao in the manner suggested by the Examiner does not render obvious the features of the present invention as now more clearly recited in the claims. Accordingly, reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claims 1-3, 10, 13, 16, and 19 as being unpatentable over Yoshiura in view of Alattar, and further in view of Rao, are respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the references used in the rejection of claims 1-3, 10, 13, 16, and 19.

In view of the foregoing amendments and remarks, Applicants submit that claims 1-21 are in condition for allowance. Accordingly, early allowance of claims 1-21 is respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417 (referencing Attorney Docket No. 501.42779X00).

Respectfully submitted,

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Annotated Marked Up Drawings

FIG.1